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ABSTRACT

This document provides a description of the competitions involved in the Mathematics Olympics held in the Springfield Public Schools (Missouri). It provides descriptions of the team events (which involved a scavenger hunt, computers, and computations) and the individual events (which involved applied geometry, calculators, conversion from ratio to fraction to decimal to percent, and problem solving). The Olympics are open to sixth grade students and all events are held in one evening. (A schedule of the events is provided). The bulk of the document contains the student tests and worksheets used in all of the events. Answer keys are provided for the teacher and a form is included for the teacher to indicate who will compete and when. (TW)

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ED285753

MATH OLYMPICS

INDIVIDUAL AND TEAM EVENTS

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SIXTH GRADE

SPRINGFIELD PUBLIC SCHOOLS SPRINGFIELD, MISSOURI

SE 048 341

BEST COPY AVAILABLE

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Math Olympics
1987
Pershing
School
2120 Ventura
Springfield, MO
May 14, 1987

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The tests in this booklet are the tests from the 1986 MATH OLYMPICS.

Junior and senior high school mathematics teachers were the writers and graders for the 1986 MATH OLYMPICS.

The Math Olympic entry form (on the last page of this booklet) will be picked up on _____. Please be sure to keep a copy of this page before this date for your own use. If you do not plan on entering students in Math Olympics 1987, we still need to pick up your entry form with "no entry" for scheduling purposes.

AWARDS

Trophies will be awarded to the schools who place 1st, 2nd and 3rd in each team event (Computers, Scavenger Hunt, and Computation).

Medals will be awarded to all students on the 1st, 2nd and 3rd place teams, and students who place 1st, 2nd and 3rd in the individual events (Calculators, Problem Solving, Conversions, and Applied Geometry).

All students who enter MATH OLYMPICS will receive a certificate of participation. Students who place in the top ten percent of the total number of students entering each event will have a seal of excellence placed on their certificate.

The trophies and medals will be furnished by the International Union of Operating Engineers Local 16-16B.

MATH OLYMPICS TEAM EVENTS

SCAVENGER HUNT: The Scavenger Hunt is a team event. Each team consists of three members. Each sixth grade classroom may enter one team. This event will be held in the patio area at Pershing School. In the case of rain, it will be held indoors. Teams will start at assigned stations on obstacle course A, B, or C. The course will consist of ten numbered stations. The three member team will agree and record their estimate of the designated length, perimeter, area or volume in both English and metric for each station. The team members may use the back of their answer sheet for computation but may use only parts of their body for measuring devices. The monitor will blow the whistle at the end of each three minute period and the team must move onto the next numbered station. Station ten will move on to station one. After the team has been at all ten stations for three minutes each, one team member should turn in the answer sheet to the grader as they exit the course. Students may use a clip board to hold their answer sheet.

COMPUTERS: The Computer event will be a 90 minute team test which will consist of writing a Logo procedure which will teach the turtle to draw and sketch the path traveled by the turtle in Logo statements. Each school may enter one team consisting of four members.

COMPUTATION: The Computation event is designed to challenge the ability of those students who are not in Advanced Sixth Grade Mathematics. Each team will consist of four students. Each sixth grade classroom may enter one team. Each team member will be given a sheet with different problems to complete. No two members of the same team will have the same problems. The team will have 55 minutes working time. The team members may work together to help one another. The team will decide together when to turn in the test papers. In case of a tie, the first team to turn in their test papers will win.

MATH OLYMPICS INDIVIDUAL EVENTS

APPLIED GEOMETRY: The students will have 55 minutes work time. This event allows the students to show their knowledge of applied geometry and use perimeter, area, circumference, and volume formulas, etc. The student with the highest score will win. In case of a tie, the student turning his/her paper in first will win. The students will be allowed to use calculators, but each student must furnish his/her own calculator.

CALCULATOR: The test for this event is composed of word problems involving percent, interest, taxes, hourly wage and overtime, average, ratio, proportion, the Pythagorian Theorem, etc. The winner will be the student with the highest score. In case of a tie, the student turning his/her paper in first will win. Students must furnish their own calculators. The students will have 25 minutes of working time.

CONVERSION FROM RATIO TO FRACTION TO DECIMAL TO PERCENT: This event is designed to stimulate interest in the relationship of fractions, decimals, ratio, and percent. The event will be in two parts: (1) Given a fraction, decimal, ratio or percent, determine the other three, (2) Given a set of objects in a plastic bag or pictures, separate them by color or other attribute and give the ratio, fraction, decimal and percent of the whole for each color or attribute. The student with the highest score will be the winner. The students will have 25 minutes of working time.

PROBLEM SOLVING: This event is designed for the more able students. The problems will be solved by a variety of approaches such as draw a picture, make a table, make a graph, guess and check, break the problem down into a series of smaller problems, etc. The winner will be the student with the highest score. The students will have 55 minutes of working time.

Tentative Time Schedule

5:15	5:30	6:00	6:30	6:45	7:00	7:30	8:00
Computers----------							
	Scavenger Hunt-----						
		Computation----------					
		Applied Geometry----------					
			Calculators---------				
			Conversions---------				
					Problem Solving------		
					Applied Geometry-----		
					Conversions---		
						Calculators-	

All events are open to all sixth grade students with the following exceptions, students in Advanced Sixth Grade Math (McGraw Math 2 text) may not enter the computation or the conversion events. Each classroom may enter only one team in the Scavenger Hunt event and one team in the Computation event. The Computer event is limited to one team from each school.

Students entering Calculators and Applied Geometry must furnish their own calculator.

8:15 Announcements and Entertainment

8:45 Awards Assembly

On the following pages are copies of the tests and answers for last year's competition. Feel free to use any of these for student practice.

SCHOOL _____ TEAM NUMBER _____

TEAM MEMBER _____ TEAM MEMBER _____ TEAM MEMBER _____

MATH OLYMPICS - SCAVENGER HUNT

Teams will start at assigned stations on obstacle course A, B, or C. The course will consist of ten numbered stations. The three member team will agree and record their estimate at each station. At the end of three minutes a whistle will be blown and the team must move onto the next numbered station. Station Ten will move to Station One. After the team has been to all ten stations for three minutes one team member should turn in your paper to the grader at the door where you entered the course.

1. The team members may touch the objects.
2. The team members will not have anything with them other than the answer sheet, clip board and a pencil.
3. The team members may do some figuring on the back of the answer sheet.
4. The team members may not use the answer sheet or clip board as a measuring device.

STATION 1

Estimate the length of the broom handle rounded to the nearest -

centimeter _____ inch _____

STATION 2

Estimate the height of the metal fence post rounded to the nearest -

decimeter _____ 1/4 foot _____

STATION 3

Estimate the distance the length of the asphalt from the building out into the patio area for course A and B, the width of the asphalt area for course C rounded to the nearest -

meter _____ yard _____

STATION 4

Estimate the perimeter of the entire window, not individual panes (framework and trim are not included) rounded to the nearest -

meter _____ yard _____

STATION 5

Estimate the circumference of the top of the wicker basket to the nearest -

decimeter_____ foot_____

STATION 6

Estimate the area of the staked-off rectangular area rounded to the nearest -

square meter_____ square foot_____

STATION 7

Estimate the area of the board rounded to the nearest -

square decimeter_____ square foot_____

STATION 8

Estimate the area of the plywood rounded to the nearest -

square centimeter_____ square inch_____

STATION 9

Estimate the volume of the box rounded to the nearest -

cubic decimeter or liter_____ cubic foot_____

STATION 10

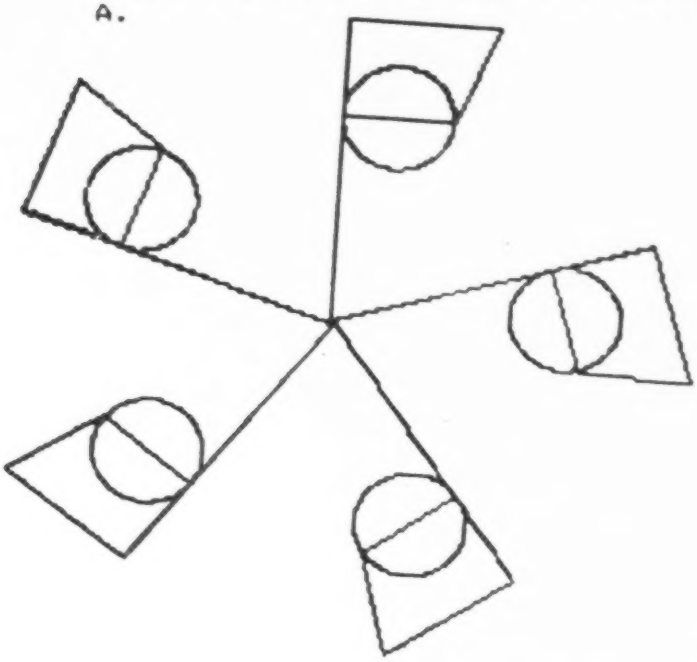
Estimate the volume of the box rounded to the nearest -

cubic centimeter_____ cubic inch_____

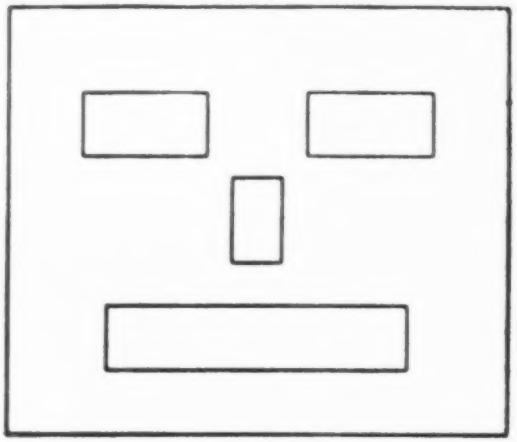
LOGO COMPUTER TEST--MATH OLYMPICS 1986

I. Use the Logo Program Diskette, storage diskette, and computer to write and save a Logo procedure which will teach the turtle to draw the following:

A.



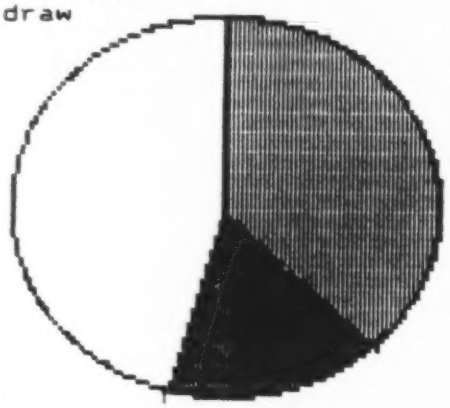
B.



C. Out of 72 people surveyed about their favorite kind of pizza, the following results were obtained:

33 Hamburger
27 Mushroom
12 Pepperoni

Write Logo procedures to draw the circle graph shown below which represents this data.



Part II.

A. Without using a computer, sketch the path traveled by the turtle in each of the following Logo statements:

1. REPEAT 5 [FD 60 RT 72]

2. REPEAT 8 [FD 100 LT 135]

3. REPEAT 3 [RT 120 FD 90 BK 60]

4. REPEAT 72 [FD 2 LT 3]

5. REPEAT 45 [FD 10 RT 10] LT 90 BK 100

B. Given the SQ and TRI procedures shown below, sketch the path of the turtle in the super procedures which follow:

```
TO SQ :N
REPEAT 4 [FD :N RT 90]
END
```

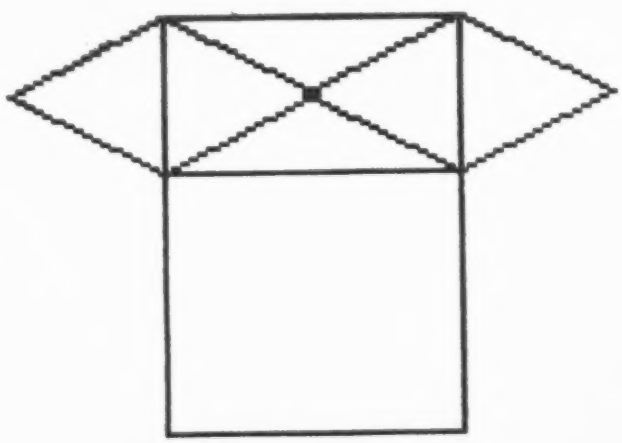
```
TO TRI
REPEAT 3 [FD 60 RT 120]
END
```

1.
```
TO PROBLEM1
CS
TRI
RT 60 SQ 60
RT 90 TRI
RT 60 SQ 40
RT 90 TRI RT 60
PU BK 80 LT 90
FD 80 RT 90 PD
SQ 160
END
```

2.
```
TO PROBLEM2
CS
SQ 60
REPEAT 3[FD 60 RT 30
         TRI RT 60]
FD 60
SQ 30
END
```

3. Correct the mistakes in the following procedure so that it would draw this figure:

```
TO PROBLEM3
TRI
RT 60
TRI
RT 60 FD 60
RT 90
FD 100
LT 90
TRI
LT 90 FD 100
SQ 60
END
```



MATH OLYMPICS
COMPUTATION I

Simplify answers involving fractions.

I. ADD

1) 7694 + 1421 + 4567 + 7209

2) 98.13 + 76.74 + 57.45 + 96.12

3) 0.0764 + 948.2 + 8.43 + 52.543

4) 4,324.26 + 9.437 + 18.57 + 476.3

5) $\frac{3}{4}$ + $\frac{3}{8}$

6) $42\frac{5}{6}$ + $19\frac{3}{8}$

7) $12\frac{1}{2}$ + $36\frac{5}{9}$ + $48\frac{5}{6}$

8) $346\frac{5}{8}$ + $512\frac{11}{12}$

II. SUBTRACT

1) 96031 − 80979

2) 98.414 − 49.987

3) 88.87 − 0.998

4) 654.7 − 318.874

5) $24\frac{3}{8} - 16\frac{1}{4}$

6) $54 - 38\frac{2}{3}$

7) $11\frac{5}{8} - 7\frac{4}{5}$

III. MULTIPLY

1) 200 X 90

2) 1534 X 63

3) 64.6 X 6.14

4) 4.375 X 1000

5) 3.03 X 497.3

6) $36 \times \frac{3}{8}$

7) $9\frac{7}{8} \times 1\frac{1}{4}$

8) $4\frac{4}{9} \times 7\frac{1}{5}$

IV. DIVIDE UNTIL THERE IS NO REMAINDER OR UNTIL THE DIGITS START TO REPEAT. IF THE DIGITS REAT, DRAW A LINE UNDER THE REPEATING DIGITS.

1) 5256 ÷ 36

2) 73692 ÷ 54

3) 1.04544 ÷ 48

4) 0.001792 ÷ 0.32

5) 999.999 ÷ 0.033

6) 37.5 ÷ 36

7) 88.59 ÷ 24

8) 7.0495 ÷ 0.75

9) 0.9758 ÷ 0.035

10) $6 \div \frac{2}{3}$

11) $8\frac{3}{8} \div 9\frac{1}{4}$

12) $9\frac{1}{2} \div 6\frac{1}{3}$

MATH OLYMPICS
COMPUTATION II

Simplify answers involving fractions.

I. ADD

1) 9187
4253
1068
+ 2111

2) 83.45
12.24
21.76
+ 58.85

3) 46.201 + 5.09 + 761.2 + 0.7607

4) 651.2 + 9472.58 + 7.418 + 93.45

5) $\begin{array}{r} 3\frac{3}{4} \\ 11 \\ +16 \\ \hline \end{array}$

6) $\begin{array}{r} 46\ \frac{5}{9} \\ 15\ \frac{3}{5} \\ \hline \end{array}$

7) $\begin{array}{r} 61\ \frac{2}{3} \\ 54\ \frac{2}{5} \\ +\ 23\ \frac{1}{4} \\ \hline \end{array}$

8) $\begin{array}{r} 512\ \frac{1}{5} \\ +\ 725\ \frac{7}{11} \\ \hline \end{array}$

II. SUBTRACT

1) 56013
− 22580

2) 56.715
− 42.672

3) 35.86 − 0.246

4) 581.4 − 384.548

5) $\begin{array}{r} 67\ \frac{2}{3} \\ -\ 54\ \frac{3}{4} \\ \hline \end{array}$

6) $\begin{array}{r} 98 \\ -\ 24\ \frac{7}{11} \\ \hline \end{array}$

7) $\begin{array}{r} 17\ \frac{3}{4} \\ -\ 12\ \frac{1}{6} \\ \hline \end{array}$

III. MULTIPLY

1) 5000 X 20

2) 7654 X 39

3) 37.6 X 1.83

4) 6.541 X 1000

5) 268.2 X 9.07

6) $36 \times \frac{2}{3}$

7) $8\frac{8}{9} \times 9\frac{1}{8}$

8) $5\frac{5}{8} \times 4\frac{1}{6}$

IV. DIVIDE UNTIL THERE IS NO REMAINDER OR UNTIL THE DIGITS START TO REPEAT. IF THE DIGITS REAT, DRAW A LINE UNDER THE REPEATING DIGITS.

1) 637 ÷ 49
2) 3450 ÷ 92
3) 168.7 ÷ 48
4) 4.578 ÷ 0.75
5) 721 ÷ 0.055
6) 92 ÷ 36
7) 68.04 ÷ 96
8) 1.6236 ÷ 0.16
9) 0.9096 ÷ 0.032
10) $12 \div \frac{1}{4}$
11) $16\frac{3}{4} \div 6\frac{7}{10}$
12) $15\frac{2}{3} \div 5\frac{1}{3}$

MATH OLYMPICS
COMPUTATION III

Simplify answers involving fractions.

I. ADD

1) 7139
4365
3012
+ 4654

2) 51.25
72.78
18.82
+ 40.05

3) $70.755 + 1.26 + 904.7 + 0.0616$

4) $25.78 + 5951.13 + 4.543 + 119.07$

5) $\begin{array}{r} 5\frac{5}{8} \\ 3\frac{3}{} \\ +10 \end{array}$

6) $\begin{array}{r} 5\frac{5}{} \\ 76\ 9 \\ 1\frac{1}{} \\ 14\ 5 \end{array}$

7) $\begin{array}{r} 2\frac{2}{} \\ 45\ 3 \\ 1\frac{1}{} \\ 38\ 5 \\ 3\frac{3}{} \\ +\ 42\ 8 \end{array}$

8) $\begin{array}{r} 4\frac{4}{} \\ 993\ 5 \\ 5\frac{5}{} \\ +\ 847\ 8 \end{array}$

II. SUBTRACT

1) 80207
− 76108

2) 67.721
− 25.764

3) $56.84 - 0.579$

4) $779.8 - 218.7$

5) $\begin{array}{r} 76 \\ -\ 4\ 5\frac{5}{8} \end{array}$

6) $\begin{array}{r} 24\ 5\frac{5}{9} \\ -\ 12\ 2\frac{2}{3} \end{array}$

7) $\begin{array}{r} 57\ 11\frac{11}{12} \\ -\ 27\ 3\frac{3}{4} \end{array}$

III. MULTIPLY

1) 50000×400

2) 1234×98

3) 74.5×8.27

4) 4.032×1000

5) 982.2×0.605

6) $35 \times 3\frac{3}{5}$

7) $7\frac{7}{9} \times 10\frac{4}{5}$

8) $5\frac{1}{5} \times 4\frac{3}{13}$

IV. DIVIDE UNTIL THERE IS NO REMAINDER OR UNTIL THE DIGITS START TO REPEAT. IF THE DIGITS REAT, DRAW A LINE UNDER THE REPEATING DIGITS.

1) $9117 \div 99$
2) $26379 \div 25$
3) $522.03 \div 55$
4) $4.032 \div 0.44$

5) $1020 \div 0.0025$
6) $262.84 \div 66$
7) $294.8 \div 32$
8) $0.28008 \div 0.4$
9) $0.03458 \div 0.002$

10) $9 \div 8\frac{3}{8}$

11) $6\frac{3}{54} \div 3\frac{3}{10}$

12) $18\frac{1}{2} \div 2\frac{1}{2}$

MATH OLYMPICS
COMPUTATION IV

Simplify answers involving fractions.

I. ADD

1) 4561 + 1762 + 4987 + 9769

2) 813.4 + 392.7 + 185.7 + 807.8

3) 574.14 + 0.147 + 67.89 + 0.0571

4) 15.83 + 319.823 + 70.27 + 6.185

5) $34\frac{2}{7} + 12\frac{1}{5} + 53\frac{1}{2}$

6) $625\frac{5}{6} + 178\frac{1}{5}$

7) $\frac{3}{8} + \frac{5}{6}$

8) $24\frac{5}{6} + 17\frac{3}{5}$

II. SUBTRACT

1) 76242 − 28806

2) 49.404 − 26.426

3) 105.99 − 1.037

4) 450.6 − 435.983

5) $60\frac{7}{9} - 14\frac{1}{4}$

6) $130 - 33\frac{1}{3}$

7) $99\frac{7}{9} - 29\frac{5}{6}$

III. MULTIPLY

1) 6000 X 600

2) 1234 X 98

3) 74.5 X 8.27

4) 0.424 X 1000

5) 352.1 X 3.52

6) $81 \times \frac{7}{9}$

7) $4\frac{2}{3} \times 11\frac{1}{7}$

8) $4\frac{1}{4} \times 2\frac{3}{8}$

IV. DIVIDE UNTIL THERE IS NO REMAINDER OR UNTIL THE DIGITS START TO REPEAT. IF THE DIGITS REAT, DRAW A LINE UNDER THE REPEATING DIGITS.

1) 5750 − 66
2) 45328 − 60
3) 735.84 − 180
4) 273.504 − 0.084
5) 906 − 0.0036
6) 8.65 − 8
7) 75.04 − 0.5
8) 0.6725 − 0.33
9) 0.6725 − 0.33
10) $15 - \frac{3}{8}$
11) $3\frac{7}{8} - 2\frac{1}{4}$
12) $5\frac{5}{8} - 15\frac{5}{6}$

Applied Geometry

MATH OLYMPICS

May 15, 1986

1. Find the area of a square that has a side length of thirteen inches.

2. Find the length of a rectangle that has a height of 12mm and an area of 180 square mm.

3. Find the area of a triangle that has a height of 2.4 inches and a base of 3.7 inches.

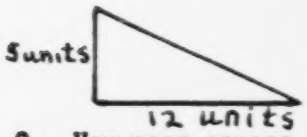
4. What is the name for a Polygon that has eight sides?

5. What are the dimensions of a rectangle that has a perimeter of 20 cm and an area of 21 cm ?

6. How many square yards of carpet will be needed to cover a room that measures 24 ft. by 18 ft.?

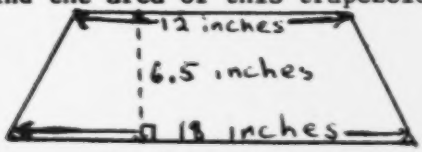
7. Find the area of a circle that has a diameter of 5 feet.

8. Find the measure of the hypotenuse of this right triangle.



9. How many square cm are in one square meter?

10. Find the area of this trapezoid.



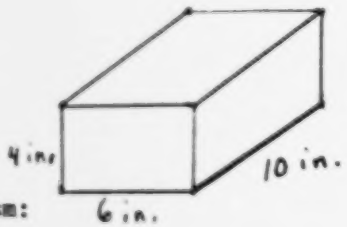
11. How many 3 1/2 inch wide boards will be needed to make a rectangular table that is 2 feet, 4 inches wide?

12. What is the diameter of a circle that has a circumference of 44 inches? ($\pi \doteq 22/7$)

13. Find the volume of a right circular cylindar that has a radius of 10 inches and a length of 20 inches.

14. Find the volume of an ice cream cone that is 11 cm long and 4 cm in diameter. ($\pi \doteq 3.14$)

15. Find the volume of this rectangular prism:



16. Find the surface area of the rectangular prism:

17. What is the volume of a sphere that will exactly fit inside a cube that has a volume of 64 cubic inches? ($\pi \doteq 3.14$)

18. Find the area of this figure: ($\pi \doteq 22/7$)

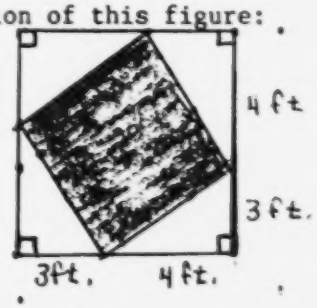
19. How many distinct squares can be made using only 8 lines?

20. What is the measure of an interior angle of a regular octagon?

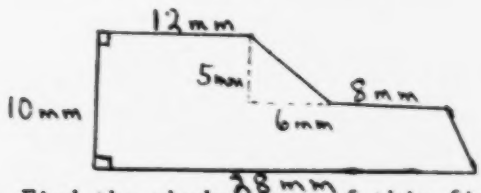
21. What is the sum of the measures of the three angles of any triangle?

22. How many posts are required to build an open ended fence that is 200 feet long and posts are spaced 10 feet apart?

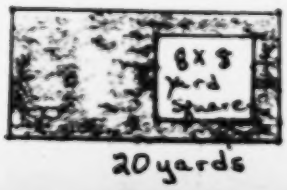
23. What is the area of the shaded region of this figure:



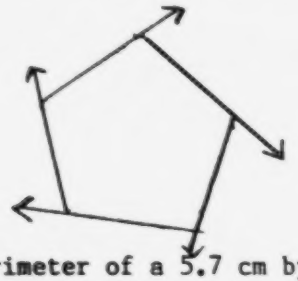
24. Find the area of this figure:



25. Find the shaded area of this figure:



26. What is the sum of the measures of the exterior angles of any polygon?

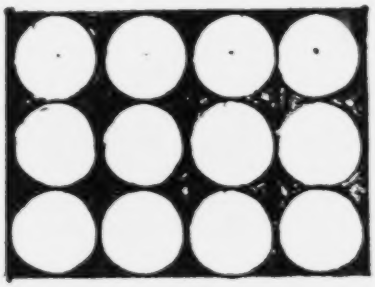


27. What is the perimeter of a 5.7 cm by 3.4 cm rectangle?

28. How many 14 inch diameter, 10 inch tall buckets of sand will it take to fill a box that is 2 feet, 4 inches wide by 8 feet long by 11 inches deep?

29. How many cubic feet of air moving 15 feet per minute will pass through a 2 feet by 3 feet rectangular window in one hour?

30. Circles of equal radii are packed in a rectangle as shown. What fraction of the rectangle if not covered by circles?



Calculators

MATH OLYMPICS

May 15, 1986

1. Mrs. Jones and her twins went shopping for clothes. They purchased one article for each boy: shoes at $32.95 per pair, Levis at $17.95 per pair, shirts at $12.95 each. How much did it cost to outfit the boys?

2. Mr. Smith, the corner merchant, buys commodities in quantity in order to receive maximum discounts. He pays $9.85/ case for corn on orders of 1 - 10 cases. He receives an additional 15% reduction on all quantities greater than 10 cases. If he buys 17 cases in all, what is his cost?

3. Joe Bob bought a Big-Mac for $1.20, large fries for 60¢, large Coke for 75¢ and a hot apple pie for 55¢ for he and his three friends. Figuring a 5-5/8% sales tax, what did he spend?

4. Hack and Slash wish to cut carpet off a roll 12' wide to cover three rooms. Assuming no waste, how many linear feet of carpet must they cut to cover rooms which measure 42' x 15', 12' x 16', and 15' x 24'?

5. Joe-Willy picks gooseberries in the summer and sells them. He has his eye on a $39.95 bicycle, a $12.50 Daisy rifle, and a Big Ben pocket watch worth $4.95. If he sells his berries for a dollar a gallon, how many gallons must he pick to buy these items?

6. There are red, blue, and black marbles in a sack. The ratio of red to blue is 3 to 5, and the ratio of blue to black is 5 to 10. If there are 35 blue marbles, how many red? How many black? How many in all?

7. Mr. H. needs a part for his tractor. The cost for the part was $27.63 when the tractor was new. Find the present cost if it is 237% of the original cost.

8. Mary's father invested in the stock market. His investments and earnings were as follows: MKOC - 86 shares @ 34¢ dividend, Kte - 124 shares @ $2.23 dividend, AnDr - 15 shares @ $1.86 dividend, Ret - 325 shares @ 54¢ dividend, and KeVN - 184 shares @ 3¢ dividend. Find his total dividend earnings.

9. Jack bought the following for a camping trip: 2 boxes of crackers @ 47¢ each, hot dogs for $1.86, chips @ $1.49, and bread for 89¢. What was his total cost with a 5% tax?

10. Joe had math scores of 13, 27, 28, 30, 36, 40, and 27. What was his average?

11. Jim bought new carpet for his mother. He covered rooms which measured 9' x 12', 4' x 17', and 14' x 18'. How many square yards did he buy?

(Hint: 1 square yard = 9 square feet)

12. On weekends, Joe collects aluminum cans and bottles. He sells cans for 15¢/ lb., pop bottles for 2¢ each and milk bottles for 5¢ each. On one weekend he collected 43 lbs. of cans, 137 pop bottles, and 23 milk bottles. How much did he make?

13. Homeroom had a party and ordered the following: 6 pizzas @ $6.25 each, 4 chips @ 89¢ each, and 25 cans of pop @ 30¢ each. If there are 24 class members, how much will each be required to pay if they share the cost equally?

14. Find the second leg of a right triangle if the first leg measures 6 meters and the hypotenuse measures 10 meters.

15. Jack will receive wages of $37.86 for the week. His expenses are: gas $12.50, lunch $5.00, dates $10.00, church $4.00, and miscellaneous $5.00. Will his wages cover his expenses? If so, by how much and if not, by how much?

16. Tom has a job working at McDonalds for $3.35 an hour. If he works from 6 p.m. to 11 p.m. Monday through Friday, how much money will Tom earn a week?

17. A large pizza is cut into 12 slices; if you eat 1/3 of the pizza, how many pieces will you eat?

18. Sally ate lunch at Wendy's. She ordered a hamburger for $1.49, french fries for 59¢ and a large Coke for 75¢. How much did her lunch cost?

19. John deposited $654 into his savings account. If it draws 7% interest a year, how much will he have in his account at the end of the year?

20. Apples are selling for 59¢ a pound. How much will 6 pounds of apples cost?

21. Adidas shoes that sell for $29.95 were marked 25% off. How much is the sale price of the shoes?

22. Jenny gets $5.00 allowance a week. She is saving to buy a camera that cost $39.00. How many weeks will it take to save enough to buy the camera?

23. Annie's dog had 4 puppies. She can sell the puppies for $35.00 each. The vet bill was $18.00. How much profit will Annie make if she sells all 4 puppies?

24. Mrs. Rogers wants to wallpaper her bedroom. She has 3 walls that measure 8' tall by 11' wide. How many square feet of paper will she need?

25. Mr. Brown made a 300 mile trip by car driving 55 mph. How long did it take for him to make the trip?

26. Debbie broke her piggy bank open. She had 5 half-dollars, 35 quarters, 51 dimes, 42 nickels, and 65 pennies. How much money does she have?

27. A board 8' long needs to be cut into 4 equal pieces. How long will each piece be?

28. Mrs. Smith bought 8 lbs. of potatoes at 12¢ a lb. How much did she spend on potatoes?

29. A living room measures 15' by 20'. If carpet cost $12.00 a square yard, how much will it cost to carpet the living room?

30. George has $20.00. He bought 2 shirts for $5.65 each. How much change will he receive from his $20.00?

31. During the basketball season Todd scored 22 points in one game, 8 points, 14 points, 4 points, and 12 points in the other games. What was his average points scored per game?

32. Mr. Jones is going to fence in his yard. It is 124' deep and 60' wide. How many feet of fence will he need?

33. Paul's math quiz scores were 10, 8, 7, 5, 9, 9, 8, 7, 5, and 10. What was his average?

34. Movie tickets were $3.50. Jann and 3 friends bought tickets. How much did it cost them?

35. If gas sells for 74¢ a gallon, how much will it cost to fill a 20 gallon tank?

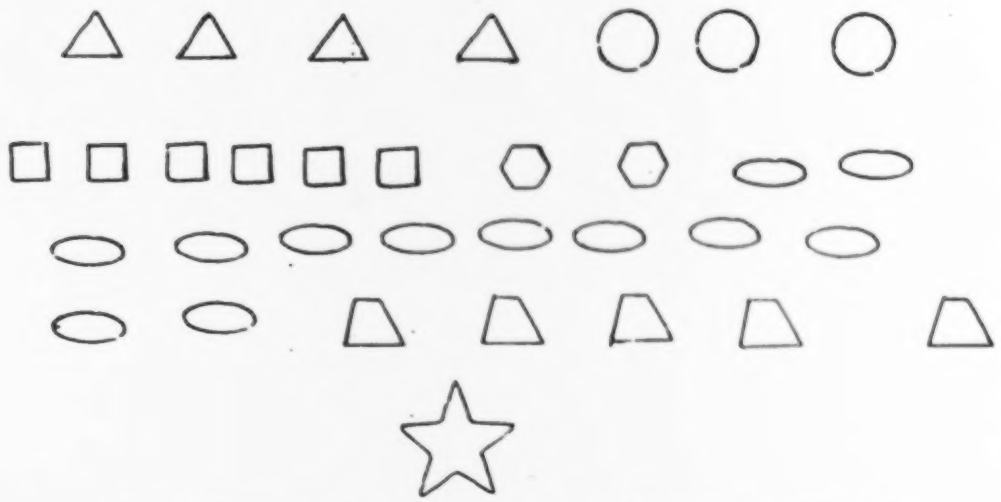
Conversions

MATH OLYMPICS

May 15, 1986

NAME: _____

SCHOOL: _____



Using the above diagram, what is the relationship of the following:

	RATIO	FRACTION	DECIMAL	PERCENT
1. Stars to triangles				
2. Ovals to trapezoids				
3. Circles to triangles				
4. Hexagons to ovals				
5. Total to trapezoids				
6. Stars to total				

You are given a bag of coins. The bag contains: 16 quarters; 15 dimes; 7 nickels; 20 pennies. Fill in the chart, reduce to simplest terms:

	RATIO	FRACTION	DECIMAL	PERCENT
7. Nickels to pennies				
8. Total coins to pennies				
9. Half-dollar to quarters				
10. Dimes to nickels				
11. Nickels to total coins				

MATH OLYMPICS - CONVERSIONS
PAGE 2

Fill in all of the chart. All fractions or mixed numeral fractions must be in lowest terms.

	MIXED NUMERAL OR FRACTION	RATIO	DECIMAL	PERCENT
12.			.36	
13.				3/4%
14.			2.103	
15.	3/4			
16.				91%
17.		7:8		
18.				166 2/3%
19.	17/20			
20.			.005	
21.		2:9		
22.				.875%
23.	6/7			
24.		1:3		
25.				1/5%
26.		7:25		
27.			.80 3/8	
28.	3/50			
29.				8 1/3%
30.		7:16		
31.			.065	
32.	1/300			
33.		13:5		

MATH OLYMPICS - CONVERSIONS
PAGE 3

	MIXED NUMERAL OR FRACTION	RATIO	DECIMAL	PERCENT
34.	_____	_____	8.2	_____
35.	13/18	_____	_____	_____
36.	_____	_____	_____	.3%
37.	_____	_____	70.31	_____
38.	2/15	_____	_____	_____
39.	5/9	_____	_____	_____
40.	_____	3:11	_____	_____
41.	_____	_____	_____	2/9%

Problem Solving

MATH OLYMPICS

May 15 1986

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1. There were 22 students surveyed. Ten said they liked hotdogs while eleven said they liked hamburgers. Two said they liked both. How many students didn't like either hotdogs or hamburgers?

2. Evaluate this expression: $\dfrac{1+\frac{1}{2}+\frac{1}{3}}{1-\frac{1}{2}-\frac{1}{3}}$

3. What is the sum of $1+3+5+\cdots+77+79+81$?

4. Last year 60 kids got indigestion at summer camp. If 75 kids get indigestion this year, what percent increase will it be?

5. The sum of three consecutive multiples of three equals 180. What are the numbers?

6. If you earned $3.50 every time you mowed the yard and $2.25 every time you washed the car, how much money would you make if you mowed four times and washed three times?

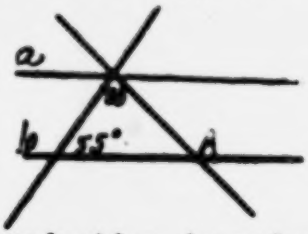
7. A man can run six miles in 44 minutes and 44 seconds. What is his average time for each mile?

8. What is the smallest number that 28, 40, and 56 all divide into with a remainder of one?

9. Which has more area-a circle with radius two inches or a square with sides of 3.6 inches?

10. What is the probability of rolling two dice and getting a sum of seven or more?

11. Find the measure of angle A in the following drawing:



12. After a 30% reduction in price a coat sells for $140. What was its original price?

13. A boy has $2.90 in quarters, dimes, and nickels. He has twice as many nickels as quarters and two more dimes than quarters. How many of each coin does he have?

14. Four chipmunks divided some acorns. The first one took one-third of them; the second two-ninths; the third one-sixth, and the last chipmunk took the remaining 10 acorns. How many acorns were there in all?

15. After the game was tied, the Cardinals scored three runs and the Penguins doubled their score. If the sum of the final scores was 15, who won?

16. If point B is one-fifth of the way from point A to point C. Find the value of point B.

17. How many ounces of a 60% acid solution must be mixed with 40 ounces at 30% solution to produce a solution of 35%?

18. A canoeist can go 60 miles downstream in the same time as he goes 25 miles upstream. The current flows at seven miles an hour. How fast does the canoeist paddle in still water?

19. A car rental agency charges $21.95 a day plus 15¢ per mile. If a businessman has a maximum daily budget of $50, then what is the most number of miles he can drive in one day?

20. A man is 42 years older than his nephew. In three years he will be eight times as old as his nephew will be. How old are they now?

ANSWERS

SCAVENGER HUNT

Answers vary according to the course.

COMPUTERS

Answers vary.

COMPUTATION

FORM I

Addition: 1) 20,891 2) 328.44 3) 1009.2494 4) 4828.567 5) 1 1/8 6) 62 5/24
7) 97 8/9 8) 859 13/24

Subtraction: 1) 15052 2) 48.427 3) 87.872 4) 335.826 5) 8 1/8 6) 15 1/3
7) 3 33/40

Multiplication: 1) 18000 2) 96.642 3) 396.644 4) 4375 5) 1506.819 6) 13 1/2
7) 12 11/32 8) 32

Division: 1) 146 2) 1364.$\overline{6}$ 3) 0.02178 4) 0.0056 5) 30303 6) 1.041$\overline{6}$
7) 3.69125 8) 9.399$\overline{3}$ 9) 27.88 10) 9 11) 67/74 12) 1 1/2

FORM II

Addition: 1) 16619 2) 176.3 3) 813.2517 4) 10224.648 5) 1 7/16 6) 62 7/45
7) 139 19/60 8) 1237 46/55

Subtraction: 1) 33433 2) 14.043 3) 35.614 4) 196.852 5) 12 11/12 6) 73 4/11
7) 5 7/12

Multiplication: 1) 100000 2) 298506 3) 68.808 4) 6541 5) 2432.574 6) 24
7) 81 1/9 8) 23 7/16

Division: 1) 13 2) 37.5 3) 3.514583 4) 6.104 5) 13109.09 6) 2.5 7) 0.70875
8) 10.1475 9) 28.425 10) 48 11) 2 1/2 12) 2 15/16

FORM III

Addition: 1) 19170 2) 182.9 3) 976.7766 4) 6100.523 5) 37/40 6) 90 34/45
7) 126 29/120 8) 1841 17/40

Subtraction: 1) 4099 2) 41.957 3) 56.261 4) 561.1 5) 71 3/8 6) 11 8/9
7) 30 1/6

Multiplication: 1) 20000000 2) 120932 3) 616.115 4) 4032 5) 594.231 6) 21
7) 84 8) 22

Division: 1) 92.09 2) 1055.16 3) 9.4914$\overline{5}$ 4) 9.163$\overline{6}$ 5) 408000 6) 3.98$\overline{24}$
7) 9.2125 8) 0.7002 9) 17.29 10) 24 11) 1 248/297 12) 7 2/5

FORM IV

Addition: 1) 21079 2) 2199.6 3) 642.2341 4) 412.108 5) 99 69/70 6) 804 1/30
7) 1 5/24 8) 42 13/30

Subtraction: 1) 47436 2) 22.978 3) 104.953 4) 14.617 5) 46 19/36 6) 96 17/1
7) 69 17/18

Multiplication: 1) 3600000 2) 120932 3) 616.115 4) 424 5) 1239.392 6) 63
7) 52 8) 10 3/32

Division: 1) 87.$\overline{12}$ 2) 755.46 3) 4.088 4) 3256 5) 251666.$\overline{6}$ 6) 1.08125
7) 150.08 8) 2.037$\overline{8}$ 9) 0.2241$\overline{6}$ 10) 40 11) 1 13/18 12) 27/76

APPLIED GEOMETRY

1) 169 sq. in. 2) 1.5 mm 3) 4.44 sq.in. 4) octagon 5) 7 cm x 3 cm 6) 48 sq.yd.
7) 19.625 sq.ft. 8) 13 units or 13 9) 10,000 sq. cm 10) 97.5 sq.in. 11) 8
12) 14 in. 13) 6280 cu.in. 14) 46.05$\overline{3}$ cu.cm or 46.05 cu. cm 15) 240 cu.in.
16) 248 sq. in. 17) 33.493332 cu.in. or 33.49 cu.in. or 33.4 cu. in.
18) 46.2 sq.in. or 46 1/5 sq.in. 19) 14 20) 135°

APPLIED GEOMETRY (cont.)
21) 180° 22) 21 posts 23) 25 sq.ft. 24) 210 sq. mm 25) 136 sq.yd. 26) 360°
27) 18.2 cm 28) 19.2 buckets 29) 5400 cu.ft. 30) 3/14 or 43/200 or 0.215

CALCULATORS
1) $127.70 2) $157.11 (or $157.09 if rounded before multiplying) 3) $3.27
4) 98.5 linear ft. 5) 57.4 gal. 6) 21 red, 70 black, 126 7) $65.48 8) $514.68
9) $5.44 10) 28.71 11) 28 sq. yd. 12) $10.34 13) $2.03 14) 8 meters 15) yes, $1.36
16) $83.75 17) 4 18) $2.83 19) $699.78 20) $3.54 21) $22.46 22) 8 weeks
23) $122.00 24) 264 sq.ft. 25) 5.45 hours or 5 5/11 hrs. 26) $1.91 27) 2 ft.
28) $0.96 or 96 ¢ 29) $400.00 30) $8.70 31) 12 points 32) 368 ft. 33) 7.8
34) $14.00 35) $14.80

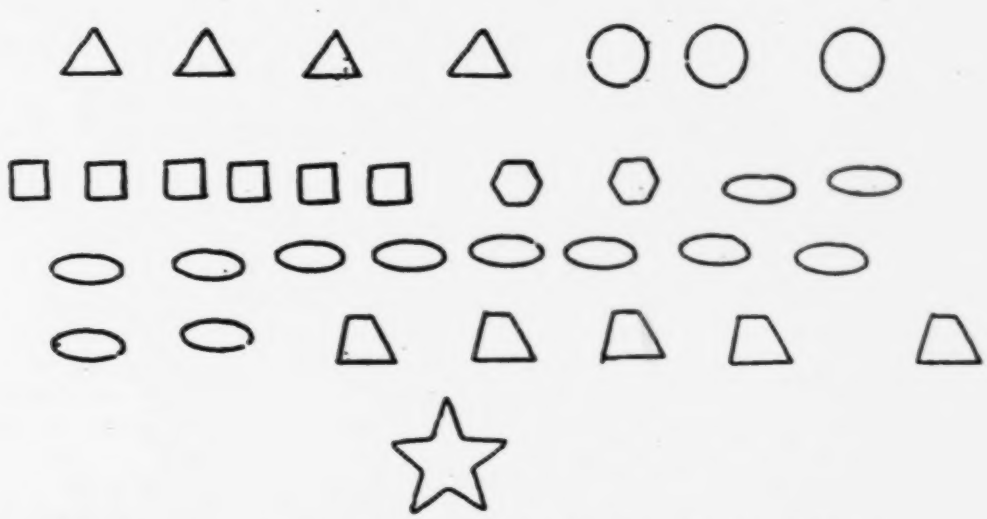
PROBLEM SOLVING
1) 3 2) 11 3) 1681 4) 25% increase 5) 57,60,63 6) $20.75 7) $7.4\overline{5}$ mi./min. or
7 41/90 mi./min. 8) 281 9) square with sides 3.6 in. 10) 21/36 = 7/12 11) 135°
12) $200 13) 6 quarters, 8 dimes and 12 nickels 14) 36 acorns 15) Penguins won 8 to 7
16) 197/225 17) 8 ounces 18) 26.6 mi./hr. 19) 187 mi. 20) 3 yrs. old and 45 yrs. old

Conversions

MATH OLYMPICS
May 15, 1986

NAME: Answer Key

SCHOOL: _____



Using the above diagram, what is the relationship of the following:

		RATIO	FRACTION	DECIMAL	PERCENT
1.	Stars to triangles	1:4	$\frac{1}{4}$	0.25	25%
2.	Ovals to trapezoids	12:5	$2\frac{2}{5}$	2.4	240%
3.	Circles to triangles	3:4	$\frac{3}{4}$	0.75	75%
4.	Hexagons to ovals	2:12 or 1:6	$\frac{1}{6}$	$0.1\overline{6}$ or $16\frac{2}{3}$	$16.\overline{6}\%$ or $16\frac{2}{3}\%$
5.	Total to trapezoids	33:5	$6\frac{3}{5}$	6.6	660%
6.	Stars to total	1:33	$\frac{1}{33}$	$0.\overline{03}$ or $.03\frac{1}{22}$	$3.\overline{03}\%$ or $3\frac{1}{33}\%$

You are given a bag of coins. The bag contains: 16 quarters; 15 dimes; 7 nickels; 20 pennies. Fill in the chart, reduce to simplest terms:

		RATIO	FRACTION	DECIMAL	PERCENT
7.	Nickels to pennies	7:20	7/20	.35	35%
8.	Total coins to pennies	29:10	$2\frac{9}{10}$	2.9	290%
9.	Half-dollar to quarters	0:16	$\frac{0}{16}$ or 0	0	0
10.	Dimes to nickels	15:7	$2\frac{1}{7}$	$2.14\frac{3}{7}$ or $2.\overline{142857}$	$214\frac{3}{7}\%$ or $2.14285\overline{7}$
11.	Nickels to total coins	7:58	$\frac{7}{58}$	$.12\frac{2}{29}$ or $.12\overline{0689}$	$12.\overline{0689}\%$ or $12\frac{2}{29}\%$

MATH OLYMPICS - CONVERSIONS
PAGE 3

	MIXED NUMERAL OR FRACTION	RATIO	DECIMAL	PERCENT
34.	$8\frac{1}{5}$	41:5	8.2	820%
35.	13/18	13:18	$0.7\overline{2}$ or $0.7\frac{2}{9}$	$72.\overline{2}$ or $72\frac{2}{9}$%
36.	$\frac{3}{1000}$	3:1000	0.003	.3%
37.	$70\frac{31}{100}$	7031:100	70.31	7031%
38.	2/15	2:15	$0.1\overline{3}$ or $0.1\frac{1}{3}$ or $0.13\frac{1}{3}$	$13.\overline{3}$% or $13\frac{1}{3}$%
39.	5/9	5:9	$0.\overline{5}$ or $0.5\frac{5}{9}$ or $0.55\frac{5}{9}$	$55.\overline{5}$% or $55\frac{5}{9}$%
40.	$\frac{3}{11}$	3:11	$0.\overline{27}$ or $0.27\frac{3}{11}$	$27.\overline{27}$% or $27\frac{3}{11}$%
41.	$\frac{1}{450}$	1:450	$0.00\frac{2}{9}$ or $0.00\overline{2}$	2/9%

MATH OLYMPICS - CONVERSIONS
PAGE 2

Fill in all of the chart. All fractions or mixed numeral fractions must be in lowest terms.

	MIXED NUMERAL OR FRACTION	RATIO	DECIMAL	PERCENT
12.	$\frac{9}{25}$	9:25	.36	36%
13.	$\frac{3}{400}$	3:400	0.0075	3/4%
14.	$2\frac{103}{1000}$	2103:1000	2.103	210.3%
15.	3/4	3:4	0.75	75%
16.	$\frac{91}{100}$	91:100	0.91	91%
17.	$\frac{7}{8}$	7:8	0.875 or $0.87\frac{1}{2}$	87.5% or $87\frac{1}{2}$%
18.	$1\frac{2}{3}$	5:3	$1.66\frac{2}{3}$ or $1.\overline{6}$	166 2/3%
19.	17/20	17:20	0.85	85%
20.	$\frac{1}{200}$	1:200	.005	0.5%
21.	$\frac{2}{9}$	2:9	$0.\overline{2}$ or $0.22\frac{2}{9}$	$22.\overline{2}$% or $22\frac{2}{9}$%
22.	$\frac{7}{800}$	7:800	0.00875	.875%
23.	6/7	6:7	$0.85\frac{5}{7}$ or $.\overline{857142}$	$85\frac{5}{7}$% or $85.\overline{714285}$%
24.	$\frac{1}{3}$	1:3	$0.33\frac{1}{3}$ or $0.\overline{3}$	$33\frac{1}{3}$% or $33.\overline{3}$%
25.	$\frac{1}{500}$	1:500	.002 or $.00\frac{1}{5}$	1/5%
26.	$\frac{7}{25}$	7:25	0.28	28%
27.	$\frac{643}{800}$	643:800	.80 3/8	$80\frac{3}{8}$% or 80.375%
28.	3/50	3:50	0.06	6%
29.	$\frac{1}{12}$	1:12	$0.08\overline{3}$ or $0.08\frac{1}{3}$	8 1/3%
30.	$\frac{7}{16}$	7:16	$0.43\frac{3}{4}$ or 0.4375	$43\frac{3}{4}$% or 43.75%
31.	$\frac{13}{200}$	13:200	.065	6.5% or $6\frac{1}{2}$%
32.	1/300	1:300	$.00\overline{3}$ or $.00\frac{1}{3}$	$0.\overline{3}$% or $\frac{1}{3}$%
33.	$2\frac{3}{5}$	13:5	2.6	260%

TEACHER _____ SCHOOL _____

ASE LIST EACH STUDENT
TICIPATING IN MATH OLYMPICS.
ER THE PROPER EVENT AND
E, PUT AN X TO INDICATE
EVENT(S) THEY WISH TO
ICIPATE IN. BE SURE THEY
NOT INVOLVED IN TWO
NTS AT THE SAME TIME.

NAMES	COMPUTERS 5:15-6:30	SCAVENGER HUNT 5:30-7:00	APPLIED GEOMETRY 6:00-7:00	CALCULATORS 6:30-7:00	CONVERSIONS 6:30-7:00	COMPUTATION 6:00-7:00	PROBLEM SOLVING 7:00-8:00	APPLIED GEOMETRY 7:00-8:00	CALCULATORS 7:30-8:00	CONVERSIONS 7:30-8:00	(This space reserved for Math Olympics Committee use)			
1.														
2.														
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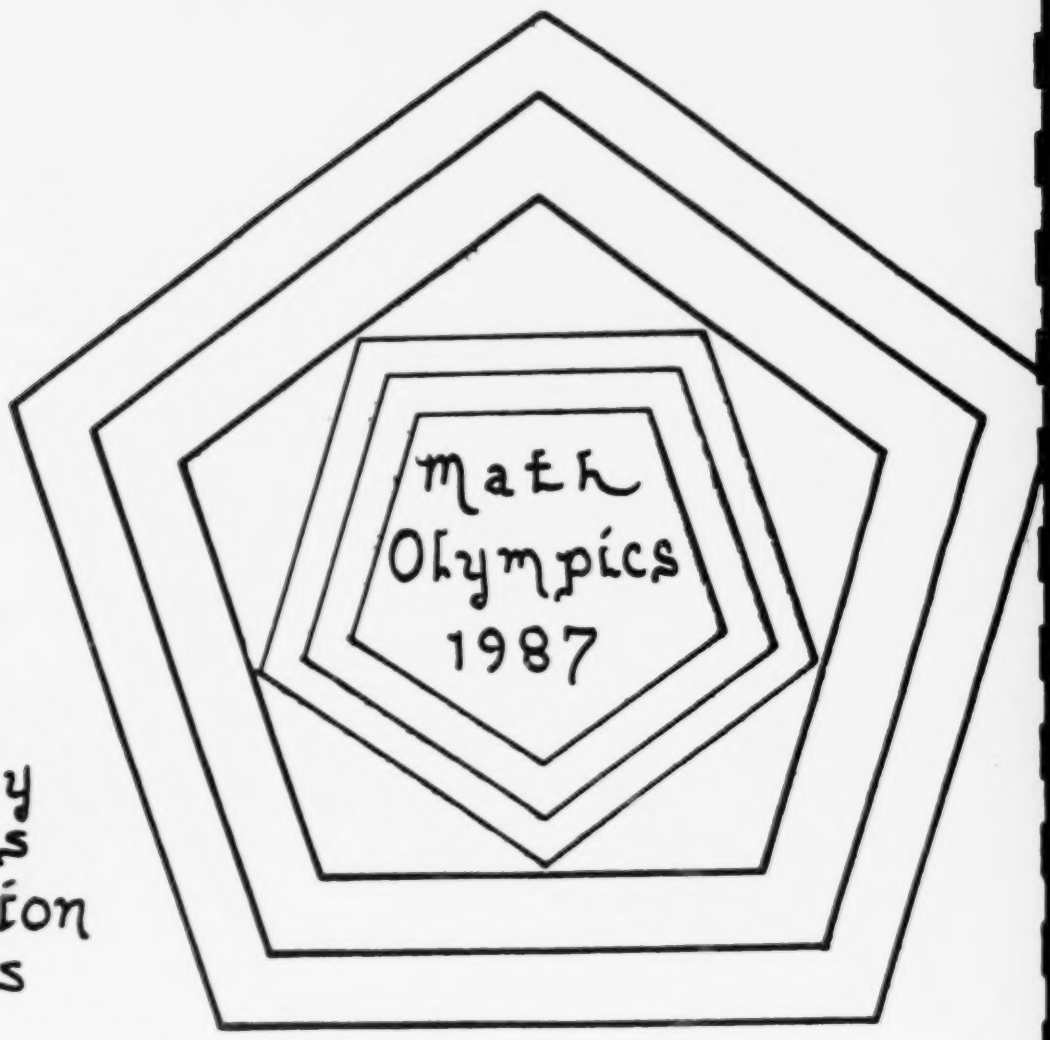
This form will be picked up by Reta Smith or Teresa Sheldon. (Check pick up date on the inside front cover of this booklet.) If you do not plan to enter students in Math Olympics 1987, please write no entry on line one and fill in your name and school at the top of the page.

Before you know it . . .



Applied Geometry
Calculators
Computation
Computers
Problem Solving
Scavenger Hunt
Conversions

Math Olympics '87
Thursday, May 14, 198
Pershing School